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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/559,094	03/23/2006	Richard Allan Tuck	920670-100774	1463

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EXAMINER	
PERRY, ANTHONY T	
ART UNIT	**PAPER NUMBER**
2879	

NOTIFICATION DATE	DELIVERY MODE
01/14/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patent-ch@btlaw.com

TH

Office Action Summary	Application No.	Applicant(s)	
	10/559,094	TUCK ET AL.	
	Examiner	Art Unit	
	Anthony T. Perry	2879	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 November 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19 and 21-34* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-19 and 21-34* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 November 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 5-11, 13-15, 18, 21-28, and 31-34 are rejected under 35 U.S.C. 102(b) as being anticipated by Macaulay et al. (US 5,552,659).

Regarding claim 1, Macaulay discloses a broad area field electron emitter in figure 8 comprising a plurality of emitter cells formed in a layered structure, each cell comprising a hole (40) at the base of which a field electron emission material (42) is disposed: wherein said layered structure comprises: an emitter layer (32) having a substrate (30) provided with an electrically conductive surface and said field electron emission material disposed on said surface; a gate electrode (38) spaced from said emitter layer, and dielectric material (36) disposed between said emitter layer and said gate electrode: and wherein: a first region of dielectric material contacts said emitter layer; a second region of dielectric material contacts said gate electrode; and means is provided for reducing cell-wall charge between said first and second regions (for example, see Fig. 8).

Regarding claim 2, Macaulay discloses a broad area field electron emitter according to claim 1, wherein said means for reducing cell-wall charge comprises an increase in the diameter of each cell from said first region to said second region (for example, see col. 5, lines 1-8).

Regarding claim 3, Macaulay discloses a broad area field electron emitter according to claim 2, wherein the side walls of each cell taper linearly from said first region to said second region (for example, see Fig. 8).

Regarding claim 5, Macaulay discloses a broad area field electron emitter according to claim 1, wherein said means for reducing cell-wall charge comprises a current-leakage path provided within said dielectric material (for example, see Fig. 8).

Regarding claim 6, Macaulay discloses a broad area field electron emitter according to claim 5, wherein said dielectric material or further material is selected from the group comprising chromium sesquioxide and silica with low concentrations of carbon or iron oxide (for example, see col. 4, lines 55-58).

Regarding claim 7, Macaulay discloses a broad area field electron emitter according to claim 1, wherein said means for reducing cell-wall charge comprises a low secondary electron yield material with first cross-over potential less than the maximum emitter layer to gate voltage of the emitter, said low secondary electron yield material comprising said dielectric material or an insulator material provided on the side walls of each cell (for example, see col. 5, lines 42-50 and Fig. 8).

Regarding claim 8, Macaulay discloses a broad area field electron emitter according to claim 7, wherein said dielectric material or further material is selected from the group comprising Cr_2O_3, SiN, a-Si SiC, carbon and implanted carbon (for example, see col. 4, lines 55-58).

Regarding claim 9, Macaulay discloses a broad area field electron emitter according to claim 1, wherein said means for reducing cell-wall charge comprises a layered configuration

within said dielectric material to provide focusing of electrons emitted by said field electron emission material (for example, see Fig. 8).

Regarding claim 10, Macaulay discloses a broad area field electron emitter according to claim 9, wherein said layered configuration comprises a thin focus electrode (34) between layers of said dielectric material.

Regarding claim 11, Macaulay discloses a broad area field electron emitter according to claim 10, wherein said thin focus electrode is of metal (for example, see col. 4, lines 49-51).

Regarding claim 13, Macaulay discloses a broad area field electron emitter according to claim 10, wherein said thin focus electrode has a thickness of less than 1 micron (for example, see col. 4, lines 58-60).

Regarding claim 14, Macaulay discloses a broad area field electron emitter according to claim 9, wherien said layered configuration comprises layers of dielectric material (34 and 36) of differing dielectric constant.

Regarding claim 15, Macaulay discloses a broad area field electron emitter according to claim 14, wherein said layers of dielectric material of differing dielectric constant comprise a layer of lower dielectric constant which has a thickness in the range 10% to 80% of the thickness of the layered configuration of said dielectric material (for example, see col. 4, lines 55-60).

Regarding claim 18, Macaulay discloses a broad area field electron emitter according to any claim 1, wherein said dielectric material includes a layer of material that is porous relative to the rest of the dielectric material, to trap electrons (for example, see col. 4, lines 55-58).

Regarding claim 21, Macaulay discloses a field electron emission device comprising a broad area field electron emitter according to claim 1, and means for subjecting said emitter to an electric field in order to cause said emitter to emit electrons (for example, see Fig. 8).

Regarding claim 22, Macaulay discloses a field electron emission device according to claim 21, comprising a substrate (30) with an array of patches of said broad area field electron emitter.

Regarding claim 23, Macaulay discloses a field electron emission device according to claim 21, comprising a plasma reactor, corona discharge device, silent discharge device, ozoniser, an electron source, electron gun, electron device, x-ray tube, vacuum gauge, gas filled device or ion thruster (see FIG. 8).

Regarding claim 24, Macaulay discloses a field electron emission device according to claim 21, wherein the broad area field electron emitter supplies the total current for operation of the device (for example, see Fig. 8).

Regarding claim 25, Macaulay discloses a field electron emission device according to claim 21, wherein the broad area field electron emitter supplies a starting, triggering or priming current for the device (for example see Fig. 8).

Regarding claim 26, Macaulay discloses a field electron emission device according to any of claims 21, comprising a display device (for example, see Fig. 8).

Regarding claim 27, Macaulay discloses a field electron emission device according to any of claims 21, comprising a lamp (for example, see col. 1, lines 8-12).

Regarding claim 28, Macaulay discloses a field electron emission device according to clam 27, wherein said lamp is substantially flat (for example, see Fig. 8).

Regarding claim 31, Macaulay discloses a field electron emission device according to any of claims 29, wherein said broad area field electron emitter and/or a phosphor (R, G, or B) are coated upon one or more one-dimensional array of conductive tracks which are arranged to be addressed by electronic driving means so as to produce a scanning illuminated line (for example, see Fig. 8).

Regarding claim 32, Macaulay discloses a field electron emission device according to claim 31, including said electronic driving means (for example, see Fig. 8).

Regarding claim 33, Macaulay discloses a field electron emission device according to any of claims 21, wherein said broad area field electron emitter is disposed in an environment which is gaseous, liquid, solid, or a vacuum (for example, see Fig. 8).

Regarding claim 34, Macaulay discloses a field electron emission device according to any of claims 21, comprising a cathode (32) which is optically translucent and is so in relation to an anode (48) that electrons emitted from the cathode impinge upon the anode to cause electro-luminescence at the anode, which electro-luminescence is visible through the optically translucent cathode (for example, see Fig. 8).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 4, 12, 16, 17, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Macaulay et al. (US 5,552,659).

Regarding claim 4, Macaulay discloses a broad area field electron emitter according to claim 2, but does not specifically teach the side walls of each cell being curved from said first region to said second region. It is noted that the applicant's specific curved shape, does not solve any of the stated problems or yield any unexpected result that is not within the scope of the teachings applied. Therefore it is considered to be a matter of choice, which a person of ordinary skill in the art would have found obvious to select any type of boundary (linear, curved, etc) for the sidewalls of the cells, as long as they are tapered from the first region to the second region.

Regarding claim 12, Macaulay discloses a broad area field electron emitter according to claim 11, but does not specifically recite chromium as the material for the focusing electrode. It has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. Thus, it would have been obvious to one having ordinary skills in the art at the time the invention was made to have contemplated the use of chromium as the metal of the focusing electrode, since the selection of known materials for a known purpose is within the skill of the art.

Regarding claim 16, Macaulay discloses a broad area field electron emitter according to claim 14, but does not specifically recite the layers of dielectric material having dielectric constants that differ in a ratio of at least 3:2. It has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide an appropriate ratio for the difference in dielectric constants for the layered configuration, since optimization of workable ranges is considered within the skill of the art.

Regarding claim 17, Macaulay discloses a broad area field electron emitter according to claim 16, but does not specifically disclose that said layers of dielectric material have dielectric constants that differ in a ratio of at least 4:1. It has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide an appropriate ratio for the difference in dielectric constants for the layered configuration, since optimization of workable ranges is considered within the skill of the art.

Regarding claim 19, Macaulay discloses a broad area field electron emitter according to claim 18, but does not specifically recite disclose that said porous material has a porosity of approximately 50%. It has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. Thus, it would have been obvious to one of ordinary skills in the art at the time the invention was made to provide an appropriate value for the porosity of the porous material, since discovering an optimum value of a result variable is considered within the skills of the art.

Claims 29-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Macaulay et al. (US 5,552,659) in view of Amrine et al. (US 6,114,802).

Regarding claims 29-30, Macaulay does not specifically teach the emitter connected to an electric drives means via a ballast resistor. However, Amrine et al. (US 6,114,802) teaches using ballast resistors in the form of laterally conducting layers (424,426,428) to segments of the emitting region in order to provide a uniform current distribution throughout the array (for example, see Fig. 4 and col. 6, lines 8-20). Accordingly, it would have been obvious to one of

ordinary skill in the art at the time the invention was made to include ballast resistors in order to provide a uniform current distribution and to improve the resolution of the display.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to *Anthony Perry* whose telephone number is **(571) 272-2459**. The examiner can normally be reached between the hours of 9:00AM to 5:30PM Monday thru Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel, can be reached on (571) 272-2457. **The fax phone number for this Group is (571) 273-8300.**

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

PETER MACCHIAROLO

/Anthony Perry/

Anthony Perry
Patent Examiner
Art Unit 2879
January 7, 2008